

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) Publication number:

0 428 186 B1

(12)

EUROPEAN PATENT SPECIFICATION(49) Date of publication of patent specification: **18.01.95** (51) Int. Cl.⁸: **F02B 63/02**(21) Application number: **90125124.9**(22) Date of filing: **01.04.86**(60) Publication number of the earlier application in accordance with Art.76 EPC: **0 197 487**(54) **Portable engine unit.**

(30) Priority: 29.03.85 JP 63814/85
29.03.85 JP 63815/85
19.04.85 JP 57412/85
19.04.85 JP 57413/85
29.03.85 JP 44951/85
26.04.85 JP 61845/85
26.04.85 JP 61846/85
26.04.85 JP 61849/85

(43) Date of publication of application:
22.05.91 Bulletin 91/21(45) Publication of the grant of the patent:
18.01.95 Bulletin 95/03(84) Designated Contracting States:
DE FR GB

(56) References cited:

GB-A- 2 054 035	JP-A- 5 118 326
JP-A- 5 751 130	JP-A-58 173 756
JP-A-59 106 794	JP-U- 5 037 294
SE-B- 391 472	US-A- 3 772 784
US-A- 4 135 301	US-A- 4 286 675
US-A- 4 296 553	US-A- 4 332 220
US-A- 4 350 123	US-A- 4 391 041
US-A- 4 422 523	US-A- 4 446 822
US-A- 4 494 490	

(73) Proprietor: **KOMATSU ZENOAH CO.**
142-1, Sakuragaoka 2-chome
Higashiyamato-shi
Tokyo (JP)

(72) Inventor: **Ueno, Tetsuo**
c/o Seiunryo,
167-3 Sakuragaoka 2-chome
Higashiyamato-shi,
Tokyo (JP)
Inventor: **Kiyooka, Katsumi**
10-13, Kitamachi 2-chome
Warabi-shi,
Saitama-ken (JP)
Inventor: **Inomata, Hideko**
143-5-401 Sakuragaoka 2-chome
Higashiyamato-shi,
Tokyo (JP)
Inventor: **Gamoh, Akira**
26-7, Gakuennishimachi 3-chome
Kodaira-shi,
Tokyo (JP)
Inventor: **Iramina, Keiko, 7-1202 Sakuragaoka-**
Danchi
44-14, Sakuragaoka 3-chome
Higashiyamato-shi,
Tokyo (JP)

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid (Art. 99(1) European patent convention).

Inventor: Ooniwa, Takashi
c/o Selunryo,
167-3, Sakuragaoka 2-chome
Higashiyamato-shi,
Tokyo (JP)

⑦ Representative: Patentanwälte Grünecker,
Kinkeldey, Stockmair & Partner
Maximilianstrasse 58
D-80538 München (DE)

Figure 5 shows another feature of the present invention, in which an annular baffle 143 is fixed to the casing 3 to cover the front sides of the fins 61. The annular baffle 143 guides effectively airflow generated by the fins 61 toward the engine 1. There is further provided a guide plate 145 which is fixed to the housing 3 and extends in a space between the engine 1 and the housing 3 to separate the space. The guide plate 145 guides the airflow generated by the fins 61 effectively around the cylinder 53 to cool it. The annular baffle 143 may be fixed directly to the peripheries of the fins 61 instead of housing 3 such that it covers the front sides of the fins 61. According to the above arrangement, a part of airflow which tends to flow forward, hits the baffle 143 and is changed its flow direction to the engine 1 side and guided by the guide plate 145 to flow around the cylinder 53.

The recoil starter 45 will now be described with reference to Figs. 5 and 6. The recoil starter 45 is arranged around the bearing portion 91 with a proper gap between them. The recoil starter 45 has on its periphery a fitting portion 147 which engages with the housing 3 as well as having on its inner side face projections 149 which engage with the crankcase 47 to prevent the rotation of recoil starter 45. A reel 151 of the recoil starter 45 is rotated against the spring force of a spiral spring 153 by pulling a starter handle (not shown) fixed to an end of a starter string 155 which is wound around the reel 151. A pivotable nail 157 is arranged on the inner surface of the magnet wheel 43 and pushed by a spring 159 against a ratchet 161 provided on the outer surface of the reel 151. The reel 151 and the spiral spring 153 may solidly be made by synthetic resin.

According to the above arrangement, if the starter handle (not shown) is pulled to pull the starter string 155, the reel 151 is rotated to engage the ratchet 161 with the nail portion 157 to rotate the magnet wheel 43. Accordingly, the crank shaft 21 which is fixed to the magnet wheel 43 is rotated to start the engine 1. After that, the nail portion 157 is pushed away by the ratchet 161 to release the engagement between them, and this released state is maintained due to the centrifugal force. If the speed of engine 1 is increased to a predetermined value, the centrifugal clutch 105 is engaged with the clutch drum 41 to transmit torque to the transmission shaft 7 via the vibration isolator joint 39. Since a gap is provided between the bearing portion 91 of crankcase 47 and the recoil starter 45, the heat and vibration of crankcase 47 is not transferred to the recoil starter 45.

Figure 7 shows that the vibration isolators 69, 71, 73, and 75 shown in Figs. 4 and 6 are located such that the gravity center of the reciprocate portions of engine 1, i.e., the gravity center of the

piston 97 and piston rod 99, moves always within a space defined by the positions of the vibration isolators 69, 71, 73, and 75. Due to this arrangement, vibration is effectively prevented.

Claims

1. A portable engine unit comprising:
an engine (1) including a clutch (41) a crankcase (47) enclosing a crank shaft (21), which is to be connected to an output shaft (7), an engine cylinder (53) having a piston (97) and a piston rod (21), a carburettor (40), an air filter (67), a recoil starter (45), a muffler (55), a housing (3) for enclosing said engine (1), and means (69, 71, 73, 75) for isolating the housing (3) from vibration caused by the engine (1), the engine (1) being fitted via the vibration isolating means (69, 71, 73, 75), and the vibration isolating means including at least four members (69, 71, 73, 75),
characterised in that
said housing (3) is dividable into two portions (15, 17) along a vertical plane (19) including the axis of the output shaft (7), and said at least four members are located so that the positions of said at least four members (69, 71, 73, 75) define a polyhedral range, and that reciprocating motion in the engine is performed within the polyhedral range.
2. The portable engine unit of claim 1, wherein the polyhedral range includes at least one tetrahedral range.
3. A portable engine unit as claimed in claim 1 or, wherein two (71, 73) of the at least four members of vibration isolating means are provided on lateral opposite sides of the engine (1), one (75) is provided on the lower side of the engine, and another one (69) is provided on the rear side of the engine.
4. A portable engine unit as claimed in claim 1, wherein said clutch (41) comprises a clutch drum and a clutch shoe member which is connected with said crank shaft (21) and said engine unit comprising further a vibration isolator joint (39) which comprises an annular member fixed on a side face of said clutch drum opposite to said crank shaft (21), said vibration isolator means being removably received in said annular member and a fitting member fixed to the center of said vibration isolator and on the output shaft (7) in and fixed to said fitting member.

5. A portable engine unit as claimed in claim 4, wherein said clutch drum being provided on one side face thereof opposite to said crank-case (47) with a plurality of projections, said vibration isolator having a plurality of holes which removably engage with said projections formed on said clutch drum, and said annular member not being provided in this case.

Patentansprüche

1. Tragbares Motoraggregat mit einem Motor (1), der eine Kupplung (41) enthält, einem Kurbelgehäuse (47), das eine mit einer Abtriebswelle (7) zu verbindende Kurbelwelle (21) umschließt, einem Motorzylinder (53) mit einem Kolben (97) und einer Kolbenstange (21), einem Vergaser (40), einem Luftfilter (67), einem Aufrollstarter (45), einem Schalldämpfer (55), einem Gehäuse (3) zum Einschließen des Motors (1), und Mittel (69, 71, 73, 75) zur Isolierung des Gehäuses (3) von durch den Motor (1) verursachten Schwingungen, wobei der Motor (1) durch die Schwingungsisolationsmittel (69, 71, 73, 75) befestigt ist und die Schwingungsisolationsmittel mindestens vier Elemente (69, 71, 73, 75) enthalten, **dadurch gekennzeichnet**, daß das Gehäuse (3) entlang einer die Achse der Abtriebswelle (7) enthaltenden Vertikalebene (19) in zwei Teile (15, 17) teilbar ist und die wenigstens vier Elemente so plaziert sind, daß die Lage der mindestens vier Elemente (69, 71, 73, 75) einen polyedrischen Raumbereich definieren, und daß eine Hin- und Herbewegung im Motor innerhalb des polyedrischen Raumbereiches ausgeführt wird.
2. Tragbares Motoraggregat nach Anspruch 1, bei dem der polyedrische Raumbereich zumindest einen tetragonalen Bereich enthält.
3. Tragbares Motoraggregat nach Anspruch 1 oder, bei dem zwei (71, 73) der wenigstens vier Elemente der Schwingungsisolationsmittel an seitlich gegenüberliegenden Seiten des Motors (1) vorgesehen sind, wobei eines (75) an der Unterseite des Motors vorgesehen ist und ein anderes (69) an der Rückseite des Motors vorgesehen ist.
4. Tragbares Motoraggregat nach Anspruch 1, bei dem die Kupplung (41) eine Kupplungstrommel und ein Kupplungsschuhselement, das mit der Kurbelwelle (21) verbunden ist, aufweist, und das Motoraggregat weiterhin ein Schwingungsisolationsgelenk (39) aufweist, das ein ringförmiges Element aufweist, das an einer

Seitenfläche der Kupplungstrommel gegenüber der Kurbelwelle (21) befestigt ist, wobei das Schwingungsisolationsmittel herausnehmbar aufgenommen ist in dem ringförmigen Element und ein an der Mitte des Schwingungsisolators befestigtes Befestigungselement auf der Abtriebswelle (7), die in dem Befestigungselement aufgenommen und daran befestigt ist.

5. Tragbares Motoraggregat nach Anspruch 4, bei dem die Kupplungstrommel an einer dem Kurbelgehäuse (47) gegenüberliegenden Seitenfläche mit einer Vielzahl von Vorsprüngen versehen ist, der Schwingungsisolator eine Vielzahl von Öffnungen aufweist, die in herausnehmbarer Weise mit den an der Kupplungstrommel ausgebildeten Vorsprüngen in Eingriff sind, und daß in diesem Fall das ringförmige Element nicht vorgesehen ist.

Revendications

1. Motoagréat portatif comportant :
un moteur (1) comprenant un embrayage (41), un carter (47) contenant un vilebrequin (21) prévu pour être relié à un arbre de sortie (7), un cylindre moteur (53) muni d'un piston (97) et d'une tige de piston (21), un carburateur (40), un filtre à air (67), un démarreur à ressort (45), un silencieux (55), un boîtier (3) contenant ledit moteur (1) et des moyens (69, 71, 73, 75) pour isoler le carter (3) des vibrations dues au moteur (1), le moteur (1) étant muni de moyens isolants anti-vibratoires (69, 71, 73, 75) et les moyens isolants anti-vibratoires comprenant au moins quatre éléments (69, 71, 73, 75),
caractérisé en ce que
ledit boîtier (3) est divisible en deux compartiments (15 et 17) suivant un plan vertical (19) contenant l'axe de l'arbre de sortie (7), les au moins quatre éléments étant situés de manière que les positions d'au moins quatre desdits éléments (69, 71, 73, 75) définissent un espace polyédrique et que le mouvement alternatif du moteur soit effectué à l'intérieur de cet espace polyédrique.
2. Motoagréat portatif selon la revendication 1, dans lequel l'espace polyédrique comporte au moins un espace tétraédrique.
3. Motoagréat portatif selon la revendication 1 ou 2, dans lequel deux (71, 73) des au moins quatre éléments des moyens isolants anti-vibratoires sont prévus sur des côtés opposés latéraux du moteur (1), un des éléments (75) étant situé sur le côté inférieur du moteur, un

autre élément (69) étant situé sur le côté arrière du moteur.

4. Motoagrégat selon la revendication 1, dans lequel ledit embrayage (41) comporte un tambour d'embrayage et un élément formant patin d'embrayage qui est relié audit vilebrequin (21), ledit motoagrégat comportant en outre un joint isolant anti-vibratoire (39) qui est constitué par un élément annulaire fixé sur le côté d'une face dudit tambour d'embrayage opposé au vilebrequin (21), les moyens isolants anti-vibratoires étant logés de façon amovible dans ledit élément annulaire, et un élément d'accouplement étant fixé au centre dudit isolateur anti-vibratoire et à l'arbre de sortie (7), qui est engagé dans ledit élément d'accouplement et fixé à celui-ci.
5. Motoagrégat portatif selon la revendication 4, dans lequel ledit tambour d'embrayage comporte sur l'une de ses faces latérales en face du carter (47) une pluralité de protubérances, une pluralité d'orifices étant ménagée dans ledit isolateur anti-vibratoire, ces orifices coiffant de façon amovible les protubérances formées sur ledit tambour d'embrayage, ledit élément annulaire n'étant pas prévu dans ce cas.
- 5
- 10
- 15
- 20
- 25
- 30
- 35
- 40
- 45
- 50
- 55
- 7

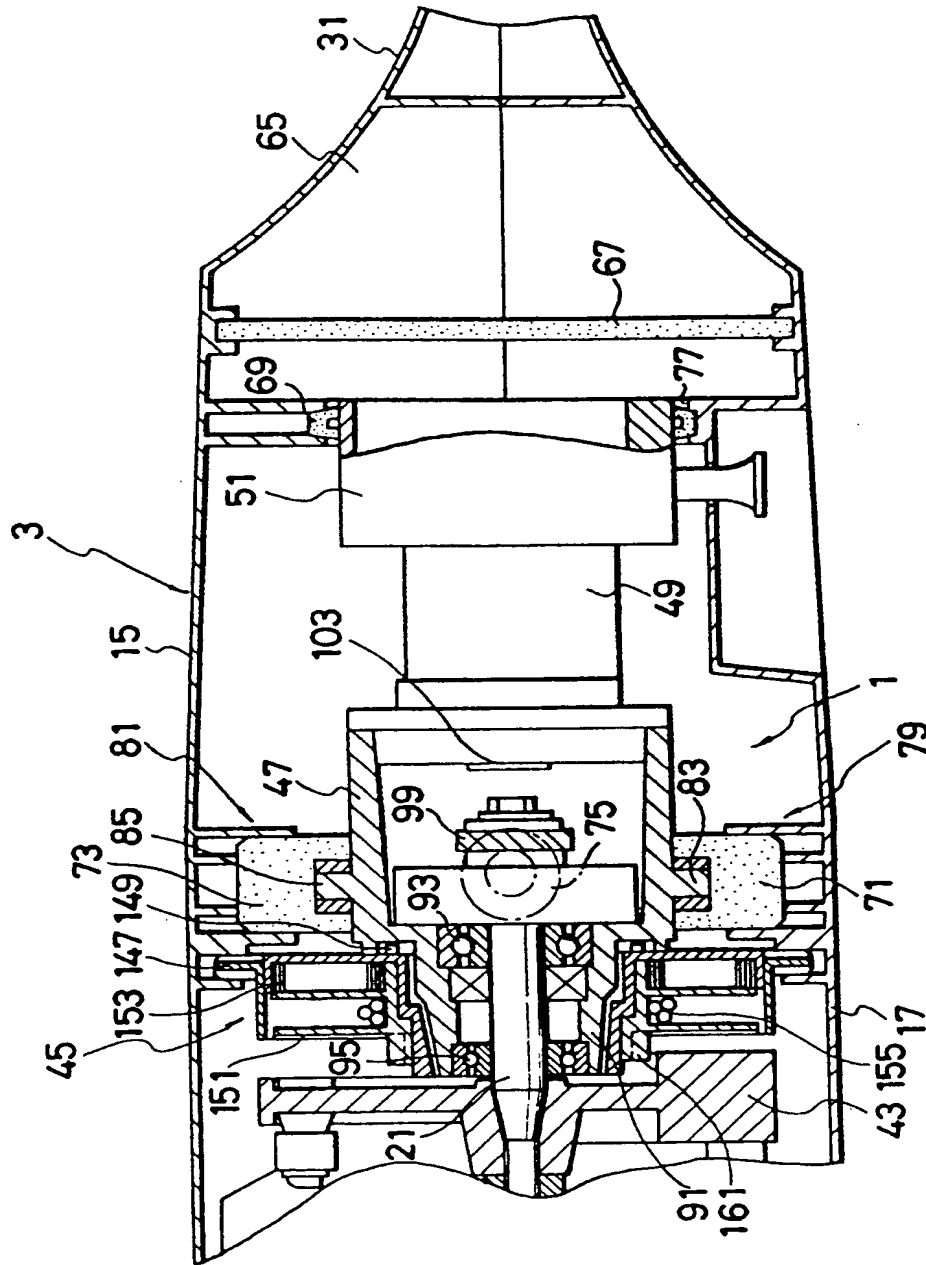


FIG. 6